Spoilers Go Bump in the Night:
Impacts of Minor and Major Reveals on Horror Film Enjoyment

Benjamin K. Johnson
Department of Advertising
University of Florida
Gainesville, FL, USA

Angel Udvardi
Department of Communication Science
Vrije Universiteit Amsterdam
Amsterdam, Netherlands

Allison Eden
Department of Communication
Michigan State University
East Lansing, MI, USA

Judith E. Rosenbaum
Department of Communication and Journalism
University of Maine
Orono, ME, USA

Address correspondence to Benjamin K. Johnson, Department of Advertising, University of Florida, 1885 Stadium Road, Gainesville, FL 32611, USA.
E-mail: benjaminkjohnson@ufl.edu

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Abstract
Spoilers are frequently a source of concern for entertainment audiences. Online discussions, promotional materials, and reviews can all potentially reveal pertinent information story plotlines, presumably ruining suspense and enjoyment. Despite these common apprehensions, recent experimental evidence suggests that narrative spoilers have modest and inconsistent effects on enjoyment and other audience responses. In this study, we investigate the implications of spoilers for horror films, a genre reliant on suspenseful thrills. Each participant was exposed to multiple scenes from a single horror film, and spoilers were manipulated at different stages of the narrative for both minor and major plot points. Results indicate no main effects of spoilers for enjoyment, transportation, suspense, processing fluency, or reactance. However, need for affect and horror fandom each moderated positive enjoyment effects of spoilers for smaller plot points such as scary moments or sudden twists. These results indicate that those who value the thrills of horror films may receive enjoyment from the anticipation produced by minor spoilers about smaller plot points.

*Keywords:* spoilers, enjoyment, processing fluency, narrative, horror film
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Is a frightening film still scary if you know the ending? The question whether spoilers ruin enjoyment is still under investigation, with extant research producing conflicting results. On the one hand, the commonly held assumption that uncertainty is key to suspense and enjoyment (Zillmann, Hay, & Bryant, 1975), and that spoilers thus ruin narratives (Hassoun, 2013), is supported by recent research showing harmful albeit modest effects of spoilers on the enjoyment of short stories (Johnson & Rosenbaum, 2015; Levine, Betzner, & Autry, 2016). On the other hand, studies have also demonstrated that spoilers can in fact improve enjoyment by facilitating processing fluency (Ellithorpe & Brookes, in press; Leavitt & Christenfeld, 2011, 2013). The present study extends existing work on spoilers by investigating a genre that is known for its reliance on suspense and fear to create enjoyment: horror. In addition, this study examines the role played by the placement of the spoiler in the story and by the spoiler’s magnitude in people’s experience of a horror movie.

The current line of research into the impact of spoilers on user experience started with the experimental finding that spoilers, instead of ruining, actually enhance people’s enjoyment of short stories (Leavitt & Christenfeld, 2011). This single study was followed by a flurry of replications which produced a series of, at times, conflicting findings. Some studies show that spoilers improved enjoyment (e.g., Ellithorpe & Brookes, in press; Leavitt & Christenfeld, 2013), others show harm to enjoyment (e.g., Daniel & Katz, 2018; Johnson & Rosenbaum, 2015; Levine et al., 2016), and others suggest people tend to overestimate the negative impact of spoilers on their enjoyment (Yan & Tsang, 2016). Further work illustrated that processing fluency mediated effects of spoilers on audience evaluations (Leavitt & Christenfeld, 2013;) and that the traits of need for cognition and need for affect had small moderating effects on spoiler acceptance and spoiler enjoyment, respectively (Rosenbaum &
MINOR AND MAJOR HORROR SPOILERS

Johnson, 2016).

Not all spoilers are created equal, either. Topolinski (2014) found that when there was a shorter delay in time between presentation of a spoiler and exposure to the narrative, the more the spoiler would decrease enjoyment. This is at odds with Levine et al. (2016), who demonstrated that spoilers presented in advance of exposure harmed enjoyment, while spoilers presented during the narrative did not influence enjoyment at all. When it comes to the nature of the spoiler, Yan and Tsang (2016) showed that, contrary to viewer expectations, spoilers that were focused on the outcome of a story did not impact enjoyment, whereas spoilers that focused on the plot decreased enjoyment. Additionally, identifying a spoiler as such, as well as the subtlety or bluntness of a spoiler, both have some small effects on narrative enjoyment (Johnson & Rosenbaum, in press; Levine et al., 2016). The present study investigates the influence of spoilers on audience enjoyment, accounting for the location (beginning, middle, or end) as well as the magnitude (big or small) of the spoiled plot point. In addition, we test mediating roles of suspense, reactance, and processing fluency, as well as moderating roles of need for cognition, need for affect, and horror fandom.

**Horror, Spoilers, and Responses**

While previous studies have considered the role of genre or genre preference in spoiler effects (Leavitt & Christenfeld, 2011; Johnson & Rosenbaum, in press), they have, so far, not focused on a specific genre. In this project, we specifically look at the effect of spoilers on the enjoyment and suspense for horror films. Horror films are movies wherein the content seems designed to induce a state of fear or terror (Sparks & Sparks, 2000). When studying spoilers, horror is a particularly relevant genre as the enjoyment of horror is linked in part to the uncertainty of not seeing certain violent events coming or not knowing who the next victim will be. Viewers of horror films know to assume that the characters with the most screen time will most likely come to a painful ending (Oliver & Sanders, 2004). When
beloved characters are in dangerous situations, this excitement ultimately creates positive emotions (Zillmann et al., 1975). The bigger the threat, the bigger the excitement, and the more pleasure and enjoyment the viewers experience when characters survive the threat. This is due to the slow decay of arousal, and the common misattribution of arousal produced during intense negative emotions (e.g., suspense) to subsequent positive outcomes such as a happy ending (excitation transfer theory; Zillmann, 1980). Spoilers are expected to undermine this uncertainty (Johnson & Rosenbaum, 2015).

On the other hand, horror has also been associated with gratifications beyond these sorts of scares, such as the thrill of seeing destruction and gore (e.g., King & Hourani, 2007; Tamborini & Stiff, 1987), which may not be impacted by spoilers at all. Linked to this pleasure in destruction, Caroll (1990) argued that horror films are attractive because they offer images and stories that viewers will not see in their daily lives. Horror movies often show behaviors that violate the norms and values of the society, and this violation of norms arouses the curiosity and fascination of the viewers (Caroll, 1990). According to this line of thinking, spoilers may have little impact on this gratification for viewers.

The present study thus focuses on horror movies as a particular case study that could help distinguish alternate factors influencing the relationship between spoilers and audience responses. In particular, regarding the horror genre, these factors are suspense, fluency, reactance, the degree of “spoiling,” and individual differences in viewers.

**Suspense.** Described as uncertainty about the desired story outcomes for specific characters, suspense is a prominent hedonic response to narratives (Oliver & Bartsch, 2010), especially those that place characters in mortal danger. Narrative uncertainty heightens arousal and pleasure (Knobloch-Westerwick & Keplinger, 2006; Zillmann et al., 1975), although suspense may be felt even if outcomes are well-known (Gerrig, 1989). Previous experimental research has shown that spoilers slightly reduce self-reported suspense (Johnson
& Rosenbaum, 2015). Moreover, a loss of suspense is a rationale most commonly invoked by audiences for spoiler avoidance (Perks & McElrath-Hart, 2016).

**Fluency.** If spoilers are likely to have a negative effect on enjoyment by harming suspense, any positive effects are likely transmitted through processing fluency, which is the ease, or fluency, with which a narrative is understood. Spoilers have been shown to benefit fluency in both experimental (Leavitt & Christenfeld, 2013) and survey studies (Ellithorpe & Brookes, in press), but other evidence has been weak or non-supportive for fluency as a mediator of spoiler effects (Daniel & Katz, 2018; Johnson & Rosenbaum, in press; Levine et al., 2016).

**Reactance.** Spoilers may also elicit reactance, a negative emotional response to the perceived loss of behavioral freedom when others impose on the individual (Reinhart et al., 2007). Reactance is relevant for spoilers, as they may be perceived to take away the “freedom” of whether or not a person wants to know what is going to happen in a narrative. To date, one experiment has tested this proposition, and found that reactance, but not enjoyment, was affected by the presence of spoilers (Johnson & Rosenbaum, in press, Study 2).

**Transportation and enjoyment.** Audience responses to narratives can also culminate in immersion into the story world, accompanied by affective and cognitive evaluations of the entertainment experience. Transportation (Green & Brock, 2000) is one of the mostly widely-used conceptualizations of immersion. During transportation, the reader or viewer mentally travels into the story world and experiences affective, cognitive, and imagery-laden engagement with characters, location, and plot. Exposure to spoilers may lead to a decrease in transportation, as the reader already knows what is going to happen and is, subsequently, more likely to think about other things while viewing or reading the story. Spoilers research to date has found mixed evidence: one study found that the cognitive dimension of
transportation alone may be harmed by spoilers (Johnson & Rosenbaum, 2015), while other experiments showed no effect (Johnson & Rosenbaum, in press, Study 1; Rosenbaum & Johnson, 2016) and a survey revealed that spoilers consistent with source material (e.g., book vs. film) had positive effects on transportation (Johnson & Rosenbaum, in press, Study 3).

Enjoyment is a positive response toward entertainment, and perhaps the most widely studied outcome of narrative consumption (Vorderer, Klimmt, & Ritterfeld, 2004). A variety of measures of enjoyment have been used in spoiler research, from single-item (Leavitt & Christenfeld, 2011; Levine et al., 2016) to multi-item (Ellithorpe & Brookes, in press; Yan & Tsang, 2016) and multidimensional inventories (Johnson & Rosenbaum, 2015, in press). Enjoyment is shown to follow from greater suspense (Zillmann et al., 1975) as well as processing fluency (Reber, Schwarz, & Winkielman, 2004), although evidence that these variables mediate effects of spoilers on enjoyment has found mixed results, with some results showing mediation (Ellithorpe & Brookes, in press; Johnson & Rosenbaum, in press, Study 3; Leavitt & Christenfeld, 2013) and others showing none (Johnson & Rosenbaum, in press, Study 1; Levine et al., 2016).

**Minor and Major Spoilers**

With previous studies finding a mix of positive, null, and negative effects on enjoyment and other outcomes, one explanation could be that spoilers vary in terms of what and how much they reveal. Some spoilers work to enhance processing fluency, while others undermine suspense or generate reactance. Yan and Tsang (2016) compared spoilers for narrative outcomes (conclusions) with spoilers for narrative processes (plot points in the middle of the narrative). Participants overestimated the harm to enjoyment from outcome spoilers but underestimated the harm from process spoilers. While both types of spoilers could reduce uncertainty, audiences respond differently to spoilers from different locations in the narrative. Levine et al. (2016) illustrated that a blunt delivery of spoilers was more likely
to harm enjoyment, in other words, spoilers that are perceived to “give away” more of the plot could be more detrimental. Moreover, Johnson and Rosenbaum (in press. Study 3) found that television spoilers that were consistent with the source material (i.e., a book series) enhanced fluency, whereas spoilers that were inconsistent with the books harmed enjoyment. Similarly, we expect that more modest, incremental spoilers help readers and viewers follow the plot, whereas revealing major plot developments or other deviations from audience expectations are expected to disorient the audience and harm processing fluency.

Within the horror context, we propose that *minor spoilers* are those that disclose suspenseful scenes and scares, whereas *major spoilers* divulge key plot twists, conclusions, and revelations. Revealing outcomes via a major spoiler is unlikely to benefit fluency as it may still be unclear or disorienting as to *how* the narrative arrives at this conclusion, whereas minor spoilers about details and the progress of the story could help guide the viewer by placing markers for plot points, allowing them to focus on the story and thus enhancing processing fluency. We thus also anticipate that minor spoilers will enhance transportation by facilitating focus on, and immersion into, the story. However, minor and major spoilers alike may hinder suspense and produce reactance, ultimately harming enjoyment.

In addition to comparing the size of the spoiler and significance of the scene that is spoiled, this study also uses a design that accounts for the order of spoilers: where they fall in a typical three-act narrative arc, i.e., the beginning, middle, and end (Aristotle, 335BCE/1926) or the *setup, complications, and resolution* (Trottier, 2014). Story arcs vary in terms of where major plot points occur, so this study will take this variation into account (Knobloch, Patzig, Mende, & Hastall, 2004; Reagan, Mitchell, Kiley, Danforth, & Dodds, 2016). Accordingly, we divide the stimuli films for this study into three acts: beginning (Act 1), middle (Act 2), and end (Act 3). In the present study design, all Act 1 spoilers are minor, all Act 3 are major, but Act 2 spoilers are either minor or major, reflecting differences in real-
MINOR AND MAJOR HORROR SPOILERS

world plot structures.

Because both types of spoilers will take away the plot-driven suspense and surprise that attracts fans to horror movies, we therefore propose the following:

**H1:** Both minor and major spoilers will diminish enjoyment.

**H2:** Reduced suspense will mediate spoiler effects on enjoyment.

**H3:** Increased reactance will mediate spoiler effects on enjoyment.

In contrast, we predict that transportation will be differentially sensitive to the size of the plot point that is spoiled. Minor spoilers allow the viewers to focus on guessing about and anticipating the big twist that still awaits them at the end, and they allow the viewers to focus on other parts of the stories that otherwise could be ignored (cf. Hassoun, 2013), whereas major spoilers could introduce further uncertainty if, for example, the narrative’s path to reaching that reveal is unclear (Johnson & Rosenbaum, in press).

**H4:** Minor spoilers will have a positive effect on transportation, and major spoilers will have a negative effect on transportation

**H5:** Fluency will mediate the effects of minor and major spoilers on transportation.

**Individual Differences**

Personality traits such as need for cognition and need for affect can have an effect on whether narrative spoilers enhance or diminish preferences and enjoyment (Rosenbaum & Johnson, 2016). Additionally, individual preferences for a format or genre may also moderate the effects of spoilers (Rosenbaum & Johnson, 2016). These findings have not yet been applied to spoilers and the horror genre, yet the traits are highly relevant to this genre.

**Need for cognition.** People who relish cognitive activities that take considerable effort are said to be high on need for cognition (NFC; Cacioppo & Petty, 1982). These individuals prefer to think deeply about narratives, want to understand a story, and enjoy guessing plot outcomes (Knobloch-Westerwick & Keplinger, 2008). Initial research findings
showed that individuals low on NFC, i.e., who do not care for abstract thinking or deep thought, were found to have a selective preference for (Rosenbaum & Johnson, 2016) and enjoyment of (Levine et al., 2016) literary spoilers. Follow-up studies by Johnson and Rosenbaum (in press), however, found this interaction did not translate to television/film spoilers. Need for cognition could be argued to be quite relevant for the horror context, as individuals high on this trait may be interested in anticipating plot points and thinking about the twists and turns of the story, while individuals low on NFC could benefit from spoilers as they ensure less cognitive effort is needed to follow the story. Therefore, we predict that:

H6: Spoilers will enhance enjoyment for low-NFC individuals.

Need for affect. Need for affect refers to the desire or motivation to seek out and experience emotions (Maio & Esses, 2001). Individuals high on need for affect (NFA) tend to pursue strong emotions; individuals low in their NFA would rather avoid them. Rosenbaum and Johnson (2016) found that the enjoyment of spoiled stories was influenced by NFA, with high-NFA individuals enjoying unspoiled short stories more. Presumably, unspoiled stories allow the reader to experience the arousal that uncertain stories evoke more intensely.

Additional research revealed mixed evidence for the role of NFA in spoilers and enjoyment (Johnson & Rosenbaum, in press), where high-NFA individuals expected less enjoyment and had lower intentions to view a film that was explicitly spoiled in advance. Higher NFA was also associated with more processing fluency in response to exposure to book-consistent Game of Thrones spoilers, and—surprisingly—more enjoyment when it came to how spoiled viewers perceived themselves to be. However, spoiler effects were not moderated by NFA in a separate study that presented movie and television clips (Johnson & Rosenbaum, in press).

More specific to the horror genre, findings show higher levels of NFA are associated with positive appraisals of negative emotions when viewing horror films (Bartsch, Appel, & Storch, 2010). These so-called meta-emotions (reflective feelings about having experienced
emotion) show that enjoyment can be produced by having experienced intense, negative, or ambivalent feelings during exposure. This helps explain why fear, disgust, and suspense can translate into positive experiences for viewers of horror film (Bartsch et al., 2010). These emotions are more valuable for high-NFA individuals; as such, they should value the shock and fear that comes from more unexpected frights (i.e., unspoiled horror).

**H7:** Spoilers will harm enjoyment for high-NFA individuals.

**Fandom.** While research on the impact of spoilers on stories from favored genres has produced contradictory results (Leavitt & Christenfeld, 2013; Rosenbaum & Johnson, 2016; Johnson & Rosenbaum, in press), when it comes to horror movies, we propose that spoilers interact negatively with fandom. As the genre is seen as attractive by many because of the uncertainty about upcoming scares and plot developments, fans of the horror genre may not enjoy spoiled films (Carroll, 1990). In contrast, individuals who do not like the horror genre may enjoy more certainty in general or find spoilers helpful for managing their expectations and emotions when watching a suspenseful or scary film.

**H8:** Spoilers will harm enjoyment for individuals who are fans of horror films.

**Method**

An online experiment was conducted with a convenience sample of participants recruited from social networks and online forums for film and horror film fans. A total of 321 individuals completed the questionnaire, but seven participants were screened out for spending less than 10 minutes on the study, resulting in a final sample of $N = 314$. The sample was 52.5% women, with a mean age of 28.51 ($SD = 9.91$). Participants were randomly assigned to one of four horror films (*Saw*, *The Descent*, *You're Next*, and *Insidious*). They were presented with the synopsis for each respective film taken from www.imdb.com, and then viewed three scenes from the film, each preceded by a short introduction that provided basic context as well as the experimental manipulations. Each film
featured scenes from the beginning of the film that set up a problem (Act 1), from the middle of the film that introduce a twist or revelation which raised the stakes (Act 2), and from the climax of the film that provided a resolution to the major action (Act 3). Responses to the film were measured with both short items after each scene as well as longer inventories after the final scene.

**Design and Manipulation**

Films were selected based on a pretest (see https://osf.io/xf96k/) which confirmed that short texts, written for three different scenes from each film, were successfully perceived as spoilers or non-spoilers. The pretest also identified *Saw* and *The Descent* as having minor-minor-major arcs, and *You're Next* and *Insidious* as minor-major-major arcs.

Minor scenes typically consisted of frights or small twists, while major scenes portrayed consequential twists, reveals, or confrontations. For example, the plot point for the second scene from *The Descent* was perceived as a minor plot point. The scene shows an incident that, while shocking, doesn’t necessarily explain or connect to the larger questions of where the monstrous threat comes from or how it will be escaped. The unspoiled introduction for this scene read:

> After one of the friends, Juno, gets attacked by a creature, she fights back and kills it. She then turns around, believing she hears yet another creature approaching her.

and the spoiled introduction read:

> After one of the friends, Juno, gets attacked by a creature, she fights back and kills it. She then turns around, accidently stabbing her friend Beth in the neck, believing she was a creature.

In contrast, the second scene for *You’re Next* was perceived as major because it provides a critical revelation about the events taking place. The unspoiled text read:

> After Erin is attacked, she hides in the bathroom, hearing a family member talk to the assassins who came to kill them all off. Erin then quickly begins to learn why the family was
targeted.

and the spoiled version read,

After Erin is attacked, she hides in the bathroom, hearing one of the sons, Felix, and his girlfriend Zee talking with the hired assassins, revealing that they hired them to kill the family to get the inheritance.

Each scene was extracted as a video clip, ranging in length from 122 to 226 seconds, $M = 173.67, SD = 32.20$. Spoilers were assigned independently for every scene, so that a participant was randomly assigned to a spoiled or unspoiled text for each individual scene. This resulted in a $2 \times 2 \times 2 \times 2$ between-subjects design.

Measures

**Single-item perceptions.** Immediately after each scene, participants responded to six short questions to capture spontaneous responses to (un)spoiled scenes. From $1 = strongly disagree$ to $7 = strongly agree$, participants indicated if “I liked the film scene,” $M = 4.25, SE = 0.09$, “the scene was suspenseful,” $M = 4.58, SE = 0.08$, “it was fun to watch,” $M = 3.96, SE = 0.09$, “I was scared,” $M = 2.99, SE = 0.09$, “The film scene was shocking,” $M = 3.83, SE = 0.08$, and “I felt transported into the film,” $M = 3.84, SE = 0.09$.

**Suspense.** A 6-item scale (Krakowiak & Oliver, 2012), e.g., "I felt excited while watching the story," $1 = strongly disagree$ to $7 = strongly agree$, was reliable, $\alpha = .863, M = 4.44, SD = 1.36$.

**Processing fluency.** A 4-item scale (Johnson & Rosenbaum, in press), e.g., "This narrative was easy to follow," $1 = strongly disagree$ to $7 = strongly agree$, was reliable, $\alpha = .859, M = 5.25, SD = 1.12$.

**Reactance.** Anger arousal reactance was measured with 4 items (Dillard & Shen, 2005), e.g., “I felt irritated after being exposed to details about the film,” $1 = strongly disagree$ to $7 = strongly agree$, $\alpha = .945, M = 2.75, SD = 1.45$. 
Transportation. A 12-item measure (Green & Brock, 2000), e.g., “I had a vivid mental image of the characters,” 1 = strongly disagree to 7 = strongly agree, was reliable, α = .797, M = 3.42, SD = 0.95.

Enjoyment. The 3-item fun scale (Oliver & Bartsch, 2010), e.g., “It was fun for me to watch this film,” 1 = strongly disagree to 7 = strongly agree, was reliable, α = .959, M = 4.10, SD = 1.83.

Need for cognition. A 17-item scale (Cacioppo, Petty, & Kao, 1984), e.g., “I would prefer complex to simple problems,” 1 = strongly disagree to 7 = strongly agree, was reliable, α = .845, M = 4.73, SD = 0.79.

Need for affect. A 10-item measure (Appel, Gnambs, & Maio, 2012), e.g., “I feel that I need to experience strong emotions regularly” 1 = strongly disagree to 7 = strongly agree, was reliable, α = .799, M = 4.83, SD = 0.90.

Horror fandom. Participants indicate three favorite film genres from a list of 22 (from www.imdb.com). Eight-nine (28.34% of the sample) individuals listed horror as a favorite. Point-biserial correlations with horror fandom, and other raw correlations among key study variables, appear in Table 1.

Procedure

Respondents accessing the study were shown a short introduction and consent form. They were not told the study was about spoilers but were warned it was about scary films. Respondents were cautioned that “some scenes may contain intense violence, blood, or flashing lights” and that they were free to stop participating at any time. The first part of the questionnaire asked about general film viewing habits and whether participants had seen or heard of any of the four films used in the study. The sample was balanced in its familiarity with the titles (63.7% had seen and 94.6% heard of Saw, 47.1% had seen and 78.0% heard of Insidious, 26.8% had seen and 47.1% heard of The Descent, and 15.9% had seen and 36.0%
heard of You’re Next). Participants who had seen or heard of movies were not removed from the sample for hypothesis testing. However, removing cases (n = 135) who had previously seen their assigned film did not substantively alter results reported below. Any potential effects of spoilers were not heightened or uniquely emergent among participants who had not previously seen the film. Narratives consumed in the past can still be spoiled during a second viewing (cf. Carroll, 1996); indeed, previous experimental and survey studies show little difference in (the lack of) spoiler effects between familiar and unfamiliar viewers (Johnson & Rosenbaum, in press).

Next, respondents were assigned to a film and asked to turn on their audio. The respondent randomly saw either a spoiled or unspoiled introductory text for each of the three film scenes they viewed. Between each scene, they were asked to complete single-item questions evaluating enjoyment, suspense, and transportation for each individual scene. After all three scenes from the film had been viewed, respondents completed questions about their responses to the film, individual differences, and demographics. Finally, respondents were debriefed on the study’s purpose (spoilers’ effects) and were asked not to disclose the purpose to others. The procedure is visualized in Figure 1.

**Analysis Plan**

To test main effects of minor and major spoilers (and corresponding narrative arc), 2x2x2x2 between-subjects ANOVAs tested effects on enjoyment and transportation, as well as suspense, processing fluency, and reactance. Full factorial ANOVAs were conducted on the experimental design, to account for their presentation in combination with each other, despite just a single interaction of interest: second act (un)spoiled X second minor/major. Alternative ANOVAs were also administered with only main effects (no factorial interactions) in the model, which produced substantively similar results. While the study design makes use of repeated presentation of spoilers and scenes, the independent
manipulation of spoilers for each scene facilitated a between-subjects design rather than a within-subjects design.

Next, regression analyses were used to test whether suspense, processing fluency, and reactance mediated effects on enjoyment and transportation, and whether need for cognition, need for affect, and horror attitudes moderated effects on enjoyment and transportation. These models were tested using the PROCESS macro (Hayes, 2013), which allows for bootstrapping mediation tests and probing interactions.

Mediation models (bootstrapped from 10,000 samples) tested each experimental factor as the independent variable, enjoyment or transportation as dependent variable, and suspense, processing fluency, and reactance as parallel mediators, while controlling for other experimental factors. Moderation analyses tested each individual difference as moderator while controlling for the other two individual differences. Additionally, for both mediation and moderation, effect of the spoiler for scene 2 was also qualified by whether it was a minor or major spoiler. Finally, the between-scene measures were tested with a MANOVA for each of the three acts. Despite the use of repeated measures, the randomized manipulation of spoiled/unspoiled for each scene necessitated the use of three MANOVAs (one for each scene) rather than a within-subjects ANOVA.

Additional measures of narrative engagement, sensation seeking, attitudes toward spoilers, and frequency of film viewing were collected but were not considered further. The study design, including predictions and power analysis, was pre-registered\(^1\) at https://AsPredicted.org/k6dmi.pdf. The questionnaire, data, and syntax are available at https://osf.io/xf96k/.

**Results**

Testing the prediction that minor and major spoilers for a horror film would produce less enjoyment (H1) as well as effects on transportation (H4) and mediator variables,
between-subjects ANOVAs indicated a general lack of main effects of spoilers on enjoyment, transportation, suspense, processing fluency, or reactance. There was a statistically significant effect of spoilers in the second scene on fluency, $F(1, 298) = 4.19, p = .042, \eta_p^2 = .014$. Spoiled second scenes produced less processing fluency, $M = 5.14, SD = 1.27$, than unspoiled second scenes, $M = 5.37, SD = 0.92$. This was not moderated by the magnitude of the spoiler, as the interaction between spoiler and narrative arc was not a significant predictor of processing fluency, $F(1, 298) = 0.353, p = .55, \eta_p^2 = .001$. Likewise, there was no effect of this interaction on enjoyment, transportation, suspense, or reactance.

There was a main effect of narrative arc on processing fluency, $F(1, 298) = 4.89, p = .028, \eta_p^2 = .016$, such that films with major plot points in the second scene produced more fluency, $M = 5.40, SD = 1.00$, compared to films with minor plot points in the second scene, $M = 5.08, SD = 1.23$. H1 and H4, for overall effects of spoilers on enjoyment and transportation as DVs, were not supported. Cell means for these ANOVAs appear in Table 2.

Mediation analyses examined mediating roles for suspense, reactance, and processing fluency (H2, H3, H5), yet found little to no indirect effects of any spoiler manipulations on enjoyment or transportation, considering suspense, processing fluency, and reactance as parallel mediators. Fluency mediated an effect of spoilers in scene 2 on transportation, $b = -0.020, SE = 0.014, 95\% CI [-0.058, -0.0004]$. The presence of a major plot point in scene 2 led to more fluency, which mediated effects on enjoyment, $b = 0.130, SE = 0.062, 95\% CI [0.024, 0.267]$ and transportation, $b = 0.029, SE = 0.018, 95\% CI [0.005, 0.078]$. Yet, the presence of a spoiler in scene 2 did not—as hypothesized—interact with the major versus minor size of the scene to predict mediation via fluency; spoilers and plot size affected fluency independently (and in opposing directions) As such, mediation hypotheses H2, H3, and H5 were not supported.

Regression analyses testing the moderating roles of traits (H6, H7, H8) also yielded
minimal effects. Minor spoilers were found to have a marginally positive relationship with enjoyment when the need for affect was higher (opposite to the direct prediction). A spoiler in scene 1 yielded a negative effect on enjoyment when need for affect was low. The interaction term was not statistically significant, $b = 0.40, SE = 0.22, p = .074, \Delta R^2 = .009$. Yet Johnson-Neyman probing revealed that the interaction between NFA and first-act spoilers was characterized by a statistically significant negative effect on enjoyment for those low on NFA ($< 4.77, 42.12\%$ of the sample). Similarly, a three-way interaction fell short of significance for NFA, second-act spoilers, and narrative arc, $b = -0.86, SE = 0.44, p = .052, \Delta R^2 = .011$. The interaction was characterized by a non-significant negative effect for those very low on NFA, as well as a positive effect of spoilers for those high on NFA, which was not significant for those $+1SD (> 5.73)$, but rather only significant for extremely high NFA individuals ($> 6.23, 4.18\%$ of the sample), but only when the spoiler was for a minor scene (i.e., for Saw or The Descent). Major spoilers were not moderated by NFA. Given the failure to meet statistical significance, and a pattern of results in the opposite direction, H7 was not supported. No moderating effects were evident for need for cognition or horror fandom, so H6 and H8 were not supported.

Additionally, transportation was examined as a pre-registered alternative to enjoyment as dependent variable in moderation models. No significant interactions emerged between spoilers and the moderators of NFC or horror fandom. For NFA, the three-way interaction with scene 2 spoiler and scene 2 size was significant, $b = -0.64, SE = 0.24, p = .007, \Delta R^2 = .023$. Johnson-Neyman probing revealed that fans showed a negative effect of the spoiler on transportation for low-NFA individuals ($< 3.77, 10.29\%$ of the sample), and a positive effect of the spoiler on transportation for high-NFA ($> 5.70, 15.11\%$ of the sample) individuals, but only when the scene was minor (Figure 2). This result mirrors the pattern of results for enjoyment of minor spoilers in the second act.
Finally, in another pre-registered exploration, we examined single-item measures (enjoyment, suspense, fun, scare, shock, and transportation) that were administered after each scene. A MANOVA was constructed for each of the three film scenes. No effects were evident for scene 1, $\Lambda_{LH} = .012$, $F(6, 306) = 0.59, p = .73, \eta^2_p = .012$, scene 2, $\Lambda_{LH} = .010$, $F(6,307) = 0.53, p = .79, \eta^2_p = .010$, or scene 3, $\Lambda_{LH} = .010$, $F(6, 307) = 0.50, p = .81, \eta^2_p = .010$, nor did any individual univariate tests emerge as significant. Likewise, the items were unaffected by the size of scene 2’s spoiler (i.e., the interaction between scene 2 spoiler and narrative arc), $\Lambda_{LH} = .029$, $F(6, 305) = 1.46, p = .19, \eta^2_p = .028$.

**Discussion**

This study advances the state of research into effects of narrative spoilers on enjoyment by employing spoilers of different magnitudes at different places in the narrative and by testing proposed mechanisms and conditional factors in the highly relevant context of horror films. As with the bulk of the existing research into spoilers, effects on enjoyment are largely absent, and very small and qualified when they do exist.

None of our pre-registered hypotheses were supported. No significant main or indirect effects of spoilers were evident in the present study. Spoilers in the second scene did produce more fluency, as did the presence of a major plot point in that scene. However, the interaction of spoiler and narrative arc (such that spoilers were minor) did not impact processing fluency and subsequent transportation.

Yet, there was evidence that spoilers might have some influence on enjoyment and transportation. Contrary to expectations, minor spoilers in the first act or second act marginally harmed enjoyment for individuals low on need for affect. Those individuals showed positive effects of minor spoilers in the second act (but not the first act). These interactions fell short of statistical significance, yet this same three-way interaction did produce an effect on transportation, such that low-NFA participants (those who do not value
emotional experiences) showed negative effects of spoilers for minor plot points in Act 2. We hypothesized (after Rosenbaum & Johnson, 2016), that high NFA individuals and horror fans would value the uncertainty and arousal provided by the absence of spoilers. Instead, high-NFA individuals reacted slightly positively to spoiled scenes with minor plot points, and low-NFA individuals reacted negatively to these minor spoilers. The results correspond to those in a recent survey which showed NFA moderated a positive effect of perceived spoiler exposure on enjoyment of a fantasy television series (Johnson & Rosenbaum, in press).

Our findings, however, suggest spoilers may play a different role in the horror genre than other types of media. The expectation of a fright or small twist may heighten enjoyment through anticipation of the scare. To that end, we cautiously offer a post-hoc interpretation of the results in which minor spoilers in particular can be beneficial as they direct attention to a coming fright, increasing viewer anticipation. This state of anticipation could heighten the viewer’s concern for the well-being of beloved characters in peril (e.g., Tamborini, Stiff, & Heidel, 1990), even if they are more certain of the character’s fate. Anxious waiting could be pleasurable for high-NFA individuals. However, the small effect size cautions against drawing robust claims about this explanation.

In contrast, the lack of moderated effects of spoilers for major plot points, and the general lack of main effects of spoilers adds to growing evidence that spoilers produce small and inconsistent or qualified effects. Even the moderated effects of minor spoilers seen here yielded very small effect sizes, in keeping with spoiler research to date (Johnson & Rosenbaum, in press; Leavitt & Christenfeld, 2011). So, it is not sufficient to point out that spoilers are beneficial for some people and harmful for others (Rosenbaum & Johnson, 2016), without further qualification. As Carroll (1996) observed with regard to re-watching of narratives, the paradox of suspense is that we can feel uncertain even when we know the
ending of a storyline, and we can generally re-experience the thrill of a narrative’s twists and
turns as if we had come to with fresh eyes and ears.

The present study also failed to replicate processing fluency as a mediator of spoilers’
impact. Existing evidence for this mechanism is mixed (Ellithorpe & Brookes, in press;
Johnson & Rosenbaum, in press; Leavitt & Christenfeld, 2013; Levine et al., 2016). While
fluency produces transportation and enjoyment, the influence of spoilers on fluency seems
tenuous, requiring further examination.

These minimal effects are in stark contrast to common “layperson” beliefs about the
harm of spoilers, and suggest that media consumers, even for horror films, should not overly
worry about spoilers in online discussions, promotional materials, or critic’s reviews. Yet
why do these beliefs about the harmful effect of spoilers persist, and why did they develop in
the first place? One promising suggestion is that spoilers are disliked because they violate the
user’s autonomy. A previous experiment illustrated that psychological reactance was
activated by spoilers (Johnson & Rosenbaum, in press). However, the present study did not
replicate this effect on reactance. Another promising explanation for the discrepancy between
spoiler beliefs and spoiler effects could be affective forecasting (Yan & Tsang, 2016).
Readers and viewers may simply fail to account for their ability to find pleasure in narratives
despite spoilers or other hindrances. Emerging norms and discourse around narrative
entertainment, especially as it takes shape online, may play an important role.

Limitations of the present approach should be acknowledged. Experimentation can
control for the delivery of spoilers, including their nature and location, but does not perfectly
reproduce in vivo reception of spoilers, in which peers, journalists, or online users may
quickly, inadvertently reveal spoilers for long-anticipated installments or new releases.
Survey research is an important corrective to these limitations (Ellithorpe & Brookes, in
press; Johnson & Rosenbaum, in press), but it is prone to other biases such as poor recall,
natural confounds, and socially desirable reporting. Subsequently, it is possible that the shortcomings of both methods mean that the impact of spoilers is never fully captured in research. A final limitation is the use of scenes rather than entire films; yet using multiple scenes does improve on previous studies that used single scenes, vignettes, or short stories.

The present study provides directions for future research. While our study used various nuanced measures, future experimental and survey research could employ measures that identify actual beliefs about what qualifies as (un)certain (cf. Ellithorpe & Brookes, in press) and continuous responses such as physiological indicators of affect. While the horror context is promising in terms of its relevance for spoilers, other genres and media should be explored as well, such as the implications of spoilers for frightening and violent interactive and immersive media (Lynch & Martins, 2015). The modest effects found in the present study, in which spoilers seemed to enhance the thrill of anticipating scares among individuals who value intense emotions, should also be investigated further.

In short, while the present study shows spoilers appear to have much weaker and conditional effects than widely believed, they could have positive potential for focusing some viewers on the impending twists, turns, and scares delivered by highly arousing media. Waiting for a scare that one knows is coming can make for an enjoyable moment.
Notes

Deviations from pre-registration should be noted. The initial sample size fell short of the pre-registered goal, $n = 221$, due to time constraints, so an additional 93 cases were collected at reviewer request in early 2018. Repeated-measures ANOVA was not deemed appropriate for the single-item between-scene perceptions, given that the presence of spoilers was manipulated independently for each scene; so MANOVAs were used for each act instead.
References


Ellithorpe, M. E., & Brookes, S. E. (in press). I didn’t see that coming: Spoilers, fan theories,


complexity and need for cognition on mystery enjoyment. *Journal of Media Psychology*, 20, 117-128. doi:10.1027/1864-1105.20.3.117


International Journal of Communication, 10, 5580-5597.


**Introduction**
- Consent
- Questions on film preferences
- Audio instructions

**Film**
- Randomly assigned to one of the following:
  - Saw
  - The Descent
  - You’re Next
  - Insidious

**Act 1**
- Randomly assigned to one of the following:
  - Spoiled text
  - Unspoiled text
  - View scene
- Single-item measures about previous scene

**Break**
- Single-item measures about previous scene

**Act 2**
- Randomly assigned to one of the following:
  - Spoiled text
  - Unspoiled text
  - (Film assignment determines minor or major)
  - View scene
- Single-item measures about previous scene

**Break**
- Single-item measures about previous scene

**Act 3**
- Randomly assigned to one of the following:
  - Spoiled text
  - Unspoiled text
  - View scene
- Single-item measures about previous scene

**Questionnaire**
- Multi-item measures (enjoyment, transportation, mediators)
- Traits (NFC, NFA)
- Demographics
- Debrief

*Figure 1.* Study design and flow of procedure.
Table 1

Zero-Order Correlations Among Key Study Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<td>1. Suspense</td>
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<td>2. Processing fluency</td>
<td>.171**</td>
<td></td>
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<td>3. Reactance</td>
<td>-.103+</td>
<td>-.217***</td>
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<td>4. Transportation</td>
<td>.724***</td>
<td>.219***</td>
<td>-.057</td>
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<tr>
<td>5. Enjoyment</td>
<td>.628***</td>
<td>.367***</td>
<td>-.166**</td>
<td>.586***</td>
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<td></td>
<td></td>
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<td>6. NFC</td>
<td>.007</td>
<td>.217***</td>
<td>-.105+</td>
<td>-.054</td>
<td>.048</td>
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<td>7. NFA</td>
<td>.060</td>
<td>.018</td>
<td>.054</td>
<td>-.040</td>
<td>-.004</td>
<td>.228***</td>
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<tr>
<td>8. Horror fandom</td>
<td>.117*</td>
<td>.207***</td>
<td>-.075</td>
<td>.180**</td>
<td>.339***</td>
<td>.113*</td>
<td>.017</td>
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Note. N = 314. NFC = need for cognition; NFA = need for affect. +p < .10, *p < .05, **p < .01, ***p < .001.
Table 2

Cell Means for ANOVAs

<table>
<thead>
<tr>
<th>Act</th>
<th>Minor</th>
<th>Unspoiled n</th>
<th>Cell Size</th>
<th>Enjoyment M (SD)</th>
<th>Transport-Motion M (SD)</th>
<th>Suspense M (SD)</th>
<th>Fluency M (SD)</th>
<th>Reactance M (SD)</th>
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<tr>
<td>Act 1</td>
<td>Minor</td>
<td>160</td>
<td>4.23 (1.71)</td>
<td>3.48 (0.90)</td>
<td>4.56 (1.29)</td>
<td>5.31 (1.06)</td>
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<tr>
<td>Act 1</td>
<td>Spoiled</td>
<td>154</td>
<td>3.96 (1.94)</td>
<td>3.36 (0.99)</td>
<td>4.30 (1.42)</td>
<td>5.18 (1.19)</td>
<td>2.76 (1.45)</td>
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</tr>
<tr>
<td>Act 2</td>
<td>Minor</td>
<td>68</td>
<td>3.97 (1.87)</td>
<td>3.56 (0.96)</td>
<td>4.43 (1.29)</td>
<td>5.25 (1.05)</td>
<td>2.66 (1.30)</td>
<td></td>
</tr>
<tr>
<td>Act 2</td>
<td>Spoiled</td>
<td>82</td>
<td>4.18 (1.84)</td>
<td>3.49 (1.04)</td>
<td>4.57 (1.40)</td>
<td>4.94 (1.35)</td>
<td>2.85 (1.38)</td>
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<tr>
<td>Act 2</td>
<td>Major</td>
<td>80</td>
<td>4.11 (1.87)</td>
<td>3.39 (0.95)</td>
<td>4.39 (1.43)</td>
<td>5.47 (0.78)</td>
<td>2.95 (1.59)</td>
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<tr>
<td>Act 2</td>
<td>Spoiled</td>
<td>84</td>
<td>4.10 (1.77)</td>
<td>3.29 (0.84)</td>
<td>4.36 (1.31)</td>
<td>5.33 (1.18)</td>
<td>2.55 (1.48)</td>
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</tr>
<tr>
<td>Act 3</td>
<td>Major</td>
<td>160</td>
<td>4.14 (1.76)</td>
<td>3.39 (0.89)</td>
<td>4.34 (1.35)</td>
<td>5.29 (1.11)</td>
<td>2.75 (1.49)</td>
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</tr>
<tr>
<td>Act 3</td>
<td>Spoiled</td>
<td>154</td>
<td>4.05 (1.90)</td>
<td>3.46 (1.01)</td>
<td>4.54 (1.36)</td>
<td>5.20 (1.14)</td>
<td>2.76 (1.41)</td>
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Figure 2. Three-way interaction between spoilers, narrative arc, and need for affect.